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John Glenn lands at Lab



JACQUELINE MCBRIDE/TID

Former astronaut and Ohio Senator John Glenn came to the Lab Monday for a sneak peek at some of the tours that will be offered during the 50th anniversary event week. Glenn will return as a guest speaker on Sept. 18. During the day, Glenn and his family toured NARAC, ASCI, NIF and other sites. Here NIF Programs AD George Miller shows a NIF target to Glenn's grandson, Daniel; daughter-in-law Karen Fagerstrom; Glenn, and his wife Anna (from left). For another look at Glenn's visit, see the story on page 5.

Anastasio to provide update today; talk to be broadcast live on Lab TV, Internet

Director Michael Anastasio will update employees during a special presentation today at 10 a.m. All employees are invited to attend the talk in the Bldg. 123 auditorium or watch it live on Lab TV Channel 2 or via the Internet.



Michael Anastasio

Among the topics Anastasio will discuss are his recent meetings with Laboratory employees in each directorate. As he mentioned in his introductory talk in July, Anastasio announced he would meet with various Lab programs, directorates and employee groups, then report on those discussions.

Seating in the auditorium is on a first-come, first-served basis. In addition to providing the talk via Lab TV, LLTN will make available 200 simultaneous RealPlayer streams to the Laboratory. The address to connect to the streaming video will be <http://paramount.llnl.gov:8080/ramgen/encoder/stateofthelab.rm>

To access this broadcast, you must have RealPlayer installed on your computer. This is a free download, located at http://forms.real.com/real/player/player.html?dc=822821820&lang=en&loc=us&src=020717real-home_mac

Note that access to the actual broadcast will not be available until approximately 15 minutes prior to Anastasio's talk. However, you may install RealPlayer now.

Anastasio's talk will be rebroadcast through the week of Aug. 26 on Lab TV Channel 2 at 10 a.m., noon, 2, 4 and 8 p.m., and 4 a.m.

Deeper understanding of sequestration

By Anne M. Stark

NEWSLINE STAFF WRITER

Lab researchers have determined that the depth of an injection of carbon dioxide into the deep ocean is a good predictor of how effective that location is at sequestering carbon away from the atmosphere.

Direct injection of CO₂ into the deep ocean has been proposed as a way to slow the accumulation of carbon dioxide in the atmosphere, one of the causes of global warming. In the direct injection scenario, fossil-fuel carbon dioxide is injected into the ocean interior, bypassing the mixing processes that would oth-

erwise cause a relatively slow transfer of excess atmospheric CO₂ in to the deep ocean.

In a study released Tuesday in *Geophysical Research Letters*, Ken Caldeira and Philip Duffy of the Climate and Carbon Cycle Modeling Group and Michael Wickett of the Center for Applied Scientific Computing, show that the depth, rather than radiocarbon, is a relatively good predictor of the effectiveness of CO₂ injection.

The researchers studied both radiocarbon dating (typically used to date anthropologic items) and the depths of injection to determine

See CARBON, page 8

JGI looks to African frog for clues on evolution, human gene function

By Charles Osolin

NEWSLINE STAFF WRITER

In their continuing search for new clues to how human genes function and how vertebrates develop and evolve, researchers at the Joint Genome Institute (JGI) are gearing up to map the DNA of a diminutive, fast-growing African frog named *Xenopus tropicalis*.

Frogs have long been a favorite subject for



biologists because their growth from eggs to tadpoles to mature organisms sheds light on the processes that guide the development of cells and organs. *X. tropicalis* was chosen for sequencing because its genetic structure is similar to humans but smaller and easier to decode than that of other frog species.

"Frogs and other amphibians occupy a key evolutionary position between mammals and fish, the organisms whose genomes have been

or are currently being sequenced," said Paul Richardson, the JGI project manager. "The publicly available *Xenopus* genome sequence will be a scientifically valuable resource for the research community."

"Until now, experiments with frogs have shown us how vertebrates develop from an egg to an organism," said Richard Harland, a developmental biologist at UC Berkeley and an early

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Diverse
diversions

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1985: Bang-up job
at Bunker 801

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IPAC spotlight on
tech transfer

— Page 7



LAB COMMUNITY NEWS

Weekly Calendar

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Friday
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Today is the deadline to RSVP for the **Lab Women’s Association’s annual membership drive and scholarship fund-raiser luncheon**, which will be held on Tuesday at 11:30 a.m. at Retzlaff Vineyards, 1356 S. Livermore Ave. Jan Tulk, AD for Administration and Human Resources, will speak on “Making a Difference,” the role women had in formulation of, and response to, the employee survey. The \$15 cost (\$10 if an LLLWA member) includes lunch and beverage. RSVP to Dianne McGovern, L-633.

Tuesday
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Looking for lunchtime entertainment? The Lab’s **Micro-century Toastmasters club** is holding its annual humorous speech contest at noon in the Bldg. 361 (Biomed) auditorium. Also featured will be a speech evaluation contest. Contact: Pete Robertson, 2-2692, Philip Cameron-Smith, 3-6634, or Don Johnston, 3-4902.

Wednesday
28

Volunteers are needed to help assemble packets for the upcoming **San Joaquin County Expanding Your Horizons** conference. The annual **packet stuffing** will be 11:30 a.m.-1 p.m. at Sandia in the 905 (CRF) Mezzanine. Badges are required (LLNL badges accepted). Refreshments will be provided. Contact: Yuki Ohashi, at 294-2393.



LLESA is sponsoring a “**blended drive**” Sept. 3-6, which means donors can give blood and at the same time sign up to be in the National Bone Marrow Registry by providing a blood sample. Employees can participate in the blood drive, the bone marrow drive or both. To schedule an appointment in advance, go to <http://www.beadonor.com> (company code: LLNL) or call the LLESA Office at 2-9402.

...

The **LLESA Bowling Networking Group** is forming a short fall league that will meet Tuesdays at 6:15 p.m., Sept. 3-Feb. 4, at Granada Bowl in Livermore. The league is open to all LLESA members, who will form five-person teams, with any combination of players. Individual players are welcome and no average is needed. The cost is \$14/week, which includes three games of bowling. Space is limited; sign up by contacting Pat Chance (chance1 or 2-2807), Lisa Szytel (szytel1 or 3-9246), or Cheloder (loder3 or 3-9001).



Lab TV

Broadcast
Schedule

Director Michael Anastasio’s Lab update will be rebroadcast on Lab TV Monday through Friday on Channel 2 at 10 a.m., noon, 2, 4, and 8 p.m and 4 a.m.

Dancing for Diversity at Day on the Green



PHOTOS BY JULIE KORHUMMEL

The Lab’s annual Diversity Day on the Green featured a number of cultural performances, exhibits and ethnic cuisine last Thursday near the Lab pool area. Left and above, performers with the Ballet Afsaneh present the traditional dance, music and poetry of Central Asia and the Mediterranean. Top, dancers with the Academy of the Hawaiian Arts perform hula kahiko, or ancient dance, performed in chant format.

Eating right talk concludes awareness campaign

This summer’s Cancer Awareness Campaign will conclude next week with a talk on nutrition. Registered dietitian Victoria Holmes Woolery of Kaiser Medical Center will discuss “Prevention, Health Practices and Good Nutrition for Cancer Survivors” at noon in Bldg. 170, room

1091. She will discuss the role medical nutrition therapy and intervention for cancer patients. This year’s campaign, organized by a grassroots coalition of employees, has featured talks, a health fair and a symbolic walk.

Employees invited to participate in fund-raising walk

Employees and their families are invited to participate in a Lab team participating in this year’s American Heart Walk on Sunday, Sept. 22, at the Danville Livery & Mercantile. The event, which begins at 9 a.m., will feature a 5K walk and 1K red cap walk. (Red caps honor survivors of heart surgery, cardiac arrest and stroke.) There also will be food booths, live entertainment, a kids’ zone and health pavilion. Walkers raise money for the American

Heart Association through pledges. The annual American Heart Walk raises money to fight heart disease and stroke, the leading causes of death in America today. To form a walking team or for more information, contact Scott Wilson in Community Relations at 3-3125 or Cathy Olsen at 3-0213. Pledge forms are also available in the Public Affairs Office, Trailer 6526.

Spanish classes to begin

The Amigos Unidos Hispanic Networking Group is offering an information session for its conversational Spanish classes at noon in Bldg. 415, room 239. Fall classes are currently scheduled to begin the week of Sept. 2. The cost of the class is \$60, which pays for 12 to 16 weeks, depending on the number of students enrolled. Ongoing classes are held Monday through Wednesday, while new beginners classes are tentatively scheduled to meet on Thursday. Each one-hour class meets once per week, between the hours of noon and 2 pm. For more information, contact: Ken Marsh, 2-2488.

Newsline

Newsline is published weekly by the Internal Communications Department, Public Affairs Office, Lawrence Livermore National Laboratory (LLNL), for Laboratory employees and retirees.

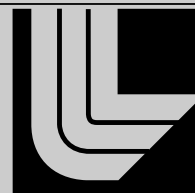
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1952 – 2002

MAKING HISTORY, MAKING A DIFFERENCE



Improving implosion images for assessing data

This is an ongoing feature highlighting the Lab's 50-year history. This week we take a look at the year 1985.

In 1985, Livermore completed the Bunker 801 project at Site 300. The newly refurbished bunker became a fully modernized hydrodynamic test facility to gather data crucial for assessing the operation of a nuclear weapon's primary stage (a pit). Until project completion, weapon designers relied largely on technologies from the 1960s for much of their hydrodynamics experimentation.

After the upgrade, Bunker 801 contained the most modern diagnostics available, including the Flash X Ray (FXR) machine. Continual upgrades to Bunker 801 since 1985 have kept the facility equipped with the most modern capabilities. For example, in the 1990s, the beam quality of the FXR was improved, and a gamma-ray camera system was installed — 70 times more sensitive than the radiographic film it replaced. With these upgrades, in 1998 the first “core punch” experiments were carried out on mock pits for two stockpiled weapons—the W76 submarine-launched ballistic missile warhead and the B83 strategic bomb.

In 2001, Bunker 801 became the Contained Firing Facility after another major upgrade, the addition of a firing chamber to contain the debris from test explosions.



Before completion of the Contained Firing Facility in 2001, tests at the Bunker 801 complex were conducted outdoors.

1985 BUNKER 801

Around the Lab



“Superkids” science honors program

In 1985 the Lab's “Superkids” program began, bringing to LLNL one high school student from each state, the Department of Defense Dependents Schools, the District of Columbia, Puerto Rico, American Samoa or Guam, and eight foreign nations.

Around the nation

- Anne Tyler's book, *The Accidental Tourist*, is published
- The first version of the Gramm-Rudman-Hollings Act is signed into law in order to control the U.S. national deficit.

Around the world

- Gorbachev becomes USSR secretary general
- US-USSR summit in Geneva
- Palestinian terrorists seize Italian cruise ship Achille Lauro

in other

NEWS

Other news around

the Lab, the nation

and the world.

For more of the Lab's rich history, check out the Timeline, located at: <http://www.llnl.gov/timeline/>

Newsline deadline for Family Days items

Family Days are coming to the Laboratory, Sept. 21-22. For the weekend, in honor of the Lab's 50th anniversary, *Newsline* will publish a special edition highlighting everything your family and friends will be able to see and do throughout the two days.

Each organization needs to send its “what's open” events and



The Lab's first Family Day was held in 1957.

activities, along with any photos it would like to include, via e-mail to newsline@llnl.gov. Listings should be in a word document; photos should be in a high-resolution JPEG format, preferably color. Photos can also be mailed to Newsline, L-797.

All listings are due Sept. 6. If you have any questions, contact Lynda Seaver at 3-3103.

Volunteers needed to escort for upcoming Family Days

Want to rub elbows with Lab guests? Always dreamed of being a tour guide?

Volunteers are needed during the 50th anniversary event week to assist with escorting duty. Escorts are needed for Community Day, Wednesday, Sept. 18, and again during Family Days, Sept. 21 and 22.

Volunteers for Family Days must be L- or Q-cleared (for Community Day they must have an AE). To volunteer for Community Day, call Scott Wilson, 3-3125 or e-mail wilson101@llnl.gov. For Family Days, call Jan Tweed, 2-4597 or e-mail tweed1@llnl.gov.



NEWS YOU CAN USE

It's about time



SCOTT WILSON/PUBLIC AFFAIRS

The Lab's 50th Anniversary time capsule is all polished and ready to be filled with memorabilia from this year and sealed in a ceremony Sept. 18 for eventual burial under the new site historic marker at the Visitors Center. Welder Bob McCXin, left, spearheaded the refurbishing of this discarded vacuum vessel and rigger Steve Sanders moved it to the Bldg. 111 lobby for display. The capsule cover is in foreground and will be bolted on during the ceremony at the Visitors Center at 4:45 p.m., Sept. 18. Employees and the public are invited to attend.

INTERNAL TRANSFER OPPORTUNITIES

Requisition	No.	Title	Organization
4705	103.1	Senior executive secretary	Chief Financial Officer Directorate
4703	126.1	Security administrator	Safeguards & Security
4415	134.1	Information systems specialist	Environmental Protection
4311	197	Manager distributed support group	Chief Financial Officer Directorate
4697	220	Post doctoral research staff member	Physics & Advanced Technologies
4373	249	Deputy plutonium facility manager	Mechanical Engineering
4568	249	Mechanical engineer	Mechanical Engineering
4687	249	Project manager	Plant Engineering
4657	270	Physicist	Defense & Nuclear Technologies
4662	270	Physicist	Defense & Nuclear Technologies
4663	270	Physicist	Defense & Nuclear Technologies
4654	270	Scientist/engineer	Energy & Environment
4728	270	Group leader/physicist	Energy & Environment
4652	285	Computer scientist	Integrated Computing & Comm.
4688	365.2	Senior planner/estimator	Plant Engineering
4639	405.3	Administrative specialist III	Staffing & Employee Development
4660	405.3	Administrative specialist III	Safeguards & Security
4661	405.3	Administrative specialist III	Safeguards & Security
4691	405.4	Administrative specialist IV	Electronics Engineering
4610	405.4	Administrative specialist IV	Environmental Protection
4708	405.4	Administrative specialist IV	Staffing and Employee Develop.
4456	502.1	Scientific technician	Hazards Control
3743	(504.2/3)	Technologist	Environmental Protection
4675	(504.2/3)	Technologist	Environmental Protection
4671	532.2	Senior fabrication technician	Electronics Engineering
4566	538.3	Sr. Technical coordinator	Mechanical Engineering
4666	650	Emergency dispatcher	Hazards Control
4653	824.1	Electrician	UTel/IEU Division
4593	831.2	Motor vechicle driver II	Plant Engineering



Coming soon. . . 2002

SCIENCE DAY

Join Lab employees as they discuss the Lab's history and present the status of programs in the areas of bio defense, climate modeling, lasers and energy, astrophysics and more.

Technical Meeting Calendar

Friday
23

INSTITUTE FOR SCIENTIFIC COMPUTING RESEARCH
"A Modular, Parallel Grid-Embedding Adaptation Scheme for General Applications," by

Roger Davis, University of California, Davis. 2 p.m., Bldg. 451, room 1025 (uncleared area). Contacts: David Keyes, 2-1325, or Leslie Bills, 3-8927

Tuesday
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ELECTRONICS ENGINEERING
"Mathematics in the Movies," by Kathleen Greene (interview candidate). From geometry and linear algebra to differential

equations and topology, mathematics is at both the foundation and the cutting edge of computer graphics.An overview of mathematics applications to computer animation and

special effects, with special emphasis on the use of probability and statistics in movies like Shrek and A Bug's Life.9:30 a.m., Bldg. 481, room 1000. Contact: Steve Azevedo, 2-8538.

Wednesday
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HED PROGRAM
"EXAFS Detection of Shock-Compressed Titanium," by Barukh Yaakobi, University of Rochester. 9 a.m, Bldg. 219, room 163 (uncleared area). Con-

tacts: Warren Hsing, 3-2849, or Bruce Remington, 3-2712.

ELECTRONICS ENGINEERING

"Image-Based Ventricular Blood Flow Analysis," by Timothy Jones (interview candidate). 1:30 p.m., Bldg. 1477 Genesis Room. Contact: Steve Azevedo, 2-8538.

Friday
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H DIVISION
"Quantum Transport in Nanowires," by Inder P. Batra, University of Illinois at Chicago. 10:30 a.m., Bldg. 219, room

163 (uncleared area). Contact: Lin H. Yangm, 4-4153.

MATERIALS SCIENCE AND TECHNOLOGY
"Grain Boundary Network" by Mukul Kumar. 3:30 pm, Bldg. 235, Gold Room (uncleared area). Coffee and cookies will be served at 3:20 pm.

The deadline for the next Technical Meeting Calendar is noon, Wednesday.

NEWS OF NOTE



Yearbook reunites Lab’s Mike Bradley and John Glenn

By Anne M. Stark
NEWSLINE STAFF WRITER

Mike Bradley had his yearbook signed for the second time Monday. And it wasn’t an autograph from a classmate, but rather an inscription from his high school’s namesake, John Glenn. Glenn and his family toured the Lab earlier this week with the first stop at the National Atmospheric Release Advisory Center. They expected an overview of the program, but what they received first was a trip down memory lane as Bradley explained how he first came to meet Glenn.

Bradley, an atmospheric scientist in the Energy & Environment Directorate, graduated from John Glenn High School in New Concord, Ohio, in 1963. He was a member of the first graduating class of 87 students. Prior to that, the students attended high school in an old building named New Concord High School.

“As a high school junior, I wrote an eight-page article on John Glenn for the 1962 yearbook,” Bradley said. “Then in November 1962, during my senior year, I interviewed John in person for the school newspaper. After the interview, he autographed my 1962 yearbook on the next page following the story I had written about him.”

That high school was in a special place: New Concord, Ohio — Glenn’s and his wife Annie’s hometown. In his introductory remarks to the Glenn family, Bradley recounted how, on Feb. 20, 1962 as a high school junior, he and his classmates had followed every moment of John’s historic flight from their small, aging school in a little town, and then added, “and that town was New Concord, Ohio.” Then Bradley



FERNANDO ALUZZI/NARAC

John Glenn (seated) signs Mike Bradley’s (left) high school year book.

held up his 1962 high school yearbook: the NECOHIAN and asked Glenn if he recognized it.

“I told the whole group including my LLNL colleagues that the first time I saw that word, I thought that maybe it was a Native American name, but that it actually stood for ‘NEW CONcord High ANnual’ — the name of our school yearbook,” Bradley said. “By the time I got to the word CONcord, John was saying the words along with me.”

Bradley then opened the NECOHIAN and turned to “Man with a Mission” the eight-page

article on Glenn’s life that Bradley had written when he was a junior. He flipped through the article and then showed everyone the next page where, almost 40 years ago, Glenn had written: “18 Nov 1962, Best regards to Mike - enjoyed the interview. J. H. Glenn, Jr.”

“He had written that inscription in very large script, filling the top half of a previously blank page,” Bradley said. “I told him that I figured he had left the bottom half of the page blank so that it would be available for another autograph today.”

Bradley also showed the Glenns the 1963 “Apogee” yearbook from John Glenn High School, which also had pictures of John Glenn. The Glenn family reminisced as they looked through Bradley’s 1962 article, which included photos of John as a child, of his parents, and even of John and Annie on their wedding day.

A little later the Glenns talked further with Bradley about New Concord, various places they both knew, and how it had changed.

It wasn’t until much later in the day that Bradley finally got a chance to read Glenn’s inscription in his high school yearbook: “To Mike - with best regards, again (double underlined) - enjoyed very much your recollection of days in New Concord - Good Luck! John Glenn, 8-19-02”

“Of course, it was great to talk personally with a real American hero, but what really makes me feel good is knowing that the Glenns were surprised and deeply touched to be welcomed to LLNL by someone who was connected to their very special hometown,” Bradley said.

HOME Campaign visits camp for ‘at risk’ children

The annual Laboratory campaign for Helping Others More Effectively, or HOME, continued its site visits to local agencies last week. Computation Directorate HOME campaign committee members hiked the woods and shady trails of Camp Arroyo, a unique collaboration of the East Bay Regional Park District and The Taylor Family Foundation.

TTFF has developed 138 rural acres of EBRPD land adjacent to Del Valle Reservoir as a dual-purpose facility to serve school-age children. During the summer the grounds are a camp for children who are “at-risk,” or who have been diagnosed with life-threatening illnesses. The camp supports these children in activities that develop personal independence and trust through peer interaction.

When school is in session, Camp Arroyo hosts a residential environmental program and Environmental Education Center. Lab employees and contractors may support the ongoing programs at Camp Arroyo through monthly or one-time HOME donations.

The annual HOME booklet containing agency information and a pledge form is now in production, and will be delivered Labwide next month. Review the booklet for more information about Camp Arroyo, or visit www.ttff.org at your convenience to see photos of campers and students enjoying the facility.



BECKY FRANK/COMPUTATION

Computation Directorate members of the 2002 HOME Campaign committee recently visited Camp Arroyo, sponsored by the Taylor Family Foundation. Campaign chair Ted Michels is flanked by (left to right) Gerri Braswell, Taylor Family Foundation development director Sonya Wilson, and Michele Bianchini-Gunn.



CLASSIFIED ADS

AUTOMOBILES

1995 - Honda Odyssey LX 130k miles, AT, A/C Original owner/Full Service History. AM/FM cass. Power Windows/Doors. \$7500 925-484-2576

1995 - Ford Escort LX 2 Dr., good running condition, great commuter, 150K miles, new timing chain,\$2000 OBO. 925-447-4825

1989 - Ford Aerostar Minivan, AT,AC, Extended, seats 7, runs good, \$1500 OBO 510-538-7444

1991 - VOLVO 740, 4-dr, AT, driver-side airbag, drk teal ext, tan fabric int. Spacious & gets 23-mpg! 127k mi.\$3950. 925-862-2084

1993 - Mercury Sable Green Wagon. Original owner. Well maintained and clean, 58K miles. \$4500. 510-373-1827

1998 - Mini-Van Plym Voyager, V6 Eng. AT/PB/PW ETC. Green. 58K Fwy Miles. \$12,500 209-835-9082

1990 - Mercury Sable, 3.8L V6, 96K mi, Burgundy, all pwr, cruise ctrl, stereo, new tires, good condition, \$2000 OBO, after 8pm. 925-455-5781

1994 - Ford Explorer Sport, cranberry red, 100k, recent routine service by dealer, new tires & brakes, very clean. 925-443-2880

1989 - BMW 735i leather heated seats, computer, CD, non-CFC A/C, CC, power windows & sun-roof 189,000 miles KBB \$8775 asking \$7500 209-836-3313

1984 - Bronco II 4x4, V6, 5 speed, AC, New clutch, transmission and brakes. Blue/white, Good cond. Fun truck. \$1,200 209-832-7630

1992 - BMW 325i Convertible, beautiful blue w/black top, 100K miles, 6-cylinder, automatic, excellent condition, future classic. Asking \$9,000 OBO!! 925-980-7179

1995 - Toyota Camry Coupe 2 Door, Dark Green, 124k, New wheels/tires, 5 sp, CD, AC, PB, PS Runs Great 510-773-1334

1993 - Acura, Integra, 3dr hatchback, AM/FM/CD stereo, alarm, A/C,PS, PW,tilt,cruise,5spd power moon roof, good running condition - \$3995 or obo 209-832-4314

1996 - Chrysler LHS Champagne w/Gray Leather, CD, security system, NEW tires, low miles, excellent condition, Must See! KBB is \$9700, sell for \$8495 925-443-8837

2001 - Mitsubishi Galant LS Loaded Excellent Condition, Leather, AM/FM C/D. Asking 23,000. 209-522-8641

2000 - Impala 3.4L V6, PS PL PW cruise, 29900 miles, cassette radio, grey cloth interior, very clean. \$15,500 209-365-7267

1987 - Pontiac TransAm/Formula, black, 153k miles, original owner, 5.0LV8, runs great, interior and body excellent, needs paint, \$2000 OBO 925-846-2835

1993 - Jeep Grand Cherokee Laredo 4X4 White, AT, PW, PL, CC, PS, PM, AM/FM Cassette, Good Condition,139000 miles,Mostly Freeway, \$6280 OBO 209-727-5637

1999 - Dodge Durango SLT 5.9 V8: Fully Loaded, Black 2 X 2 with lowering kit, leather interior, Centerline Wheels, Great Condition. 20K OBO. 925-679-1090

1990 - Jeep Cherokee Laredo 4X4, White, AT, AC, PL, PM, CC, AM/FM/Cassett Stereo, Tilt Wheel, Bra, 99k, \$5200/OBO 925-376-0316

1994 - Acura Integra LS Coupe, 155K miles, runs well, A/C AM/FM Cassette, moon roof, alarm. \$4900 obo. 925-447-4750

1995 - GMC Safari Van,Extended,8 Pass,AWD,Great for Skiing!Loaded,SLT trim, new tires, brakes, tuneup,123k miles,high book \$10,600,\$7900/B.O. 209-599-4644

1995 - Black Jeep Wrangler S 4x4, 61K mi, looks and runs great, soft top, AM/FM-CD, rollbar speakers. \$7K obo. 925-449-5822

1969 - Silver Datsun 510 Coupe Completely restored (15K invested) Well maintained \$8500. 510-418-2200

1987 - Ford Ranger, 4WD w/shell, hi miles, good condition. \$2,700. Call Scott or Pauline at 510-569-7797

1991 - Ford Explorer-Eddie Bauer/4wd Manual 4.0I V6 Amplified Stereo, Yakima Bike Rack, Hitch Equipped,Runs Good. 150k+ Miles \$5900 Obo 925-413-0703

1993 - Honda Acrd 2/dr 139Kmi. Good condition needs some work. CD Sun roof. Call after 8pm. 925-784-6191

1984 - Chevy Van 20 fully contained, 85K mi, automatic, refrigerator, fresh water tank, toilet, gas heat, AC, as is \$6000/OBO. 925-443-4629

1993 - Infinity G20. Loaded. Excellent condition. \$5800 (\$1200 under retail book)

925-426-8008

1999 - Corvette Coupe, silver exterior with grey and black leather interior. Loaded. 53K miles. \$30,000.00 925-212-7231

1988 - Oldsmobile Cutlass. V-8, 75,000 miles. \$2160. Immaculate. Driven by little old lady once a week to beauty shop. 925-443-2277

1995 - Suburban SLE - Brown/Tan Cloth Interior. \$11,000. Good Condition, New Radiator, Battery, and Tires. V8 Engine, Automatic Trans, 4WD, 125k miles. 925-443-2715

1990 - Nissan 300ZX 2+2, newer body style, good working condition, 5-speed tranny, car handles great on the curves. \$4500 o/b 209-824-7750

1999 - Eclipse GS, new transmission, tires, timing belt, excellent condition. 209-669-1518

AUTOMOBILE ACCESSORIES

Four each new tires and aluminum alloy rims from 2002 Ford Explorer (five lug). Michelin P-235/70R16 104S-MS. \$300.00 925-212-7231

Fiberglass shell, Pewter color, fits 1999 or later Chevy/GMC shortbed truck. Tinted pop-out side and sliding cab windows, excellent cond. \$525.00/OBO 925-371-4447

Fog Light Lens (clear) for HELLA 550 housings New \$40.00 per pair 925-443-7752

One new 14 x175/70 Michelin A4 TIRE on 4 bolt Ford Escort rim \$28 925-447-7070

BICYCLES

Girls 12 in. bike, very good condition. \$20 209-848-8965

Giant 12in lil puddin bike.Exc cond.\$40.Giant child carrier seat.Seat easily removes leaving acc rack.\$30. 209-830-0684

26in, 12 speed, MAGNA mountain bike. Almost new. \$50.00 925-292-2373

Ladies 10 speed bike. Used only 5 times. Excellent condition. \$60. 925-648-0671

BOATS

Flying Junior FJ13 Franks Fiberglass vintage. Comes with trailer and rigged to sail. Great Del Valle boat. \$500 obo 925-828-8533

1986 Rinell, 18.5 Ft, Fish or Ski, Open Bow, Low hours on replaced OMC 350 V-8, I/O. Dual Axle Trailer, Good condition. \$5,800, OBO. 925-833-8339

CAMERAS

Digital camera. Kodak DC3400 2.1 megapixel, USB, 32MB compact flash card, NIMH batteries and charger. Excellent image quality. \$190. 925-443-2510

ELECTRONIC EQUIPMENT

Intel PII 350mhz, 128mbRam, 6.4gb+10.2gb HardDrive, Modem 56kpbs,top notch parts, Windows98s.e, MSoffice2000+, Have monitor if needed. \$200obo Call! 925-454-3213

Vandersteen Model 1B Stereo Speakers w/floor stands. Black with black oak trim. Excellent. Specs similar to Model 1C \$300.00 510-489-6030

Apple Quadra 840AV with Laser Printer. All in excellent condition. Has MS Suite installed. Word, Excel, PowerPoint. \$75 OBO. 925-245-1414

Sony 26 inch console color TV, model KV2602. Works well, very nice oak cabinet. \$50. 209-836-4605

P166MMX Computer, 64MB RAM, 3.2GB HD, CD-ROM & Writer, WIN98, Office 97, Encarta 98, MS Works. No monitor. \$50 or offer. 925-829-5890

Used laptops/desktops. AMD Athlon 700+motherboard. USR v.90/56k PCMCIA modem. Other pcmcia/pci/isa cards, motherboards, cpus, atx case, cheap. 209-327-0012

Home Satellite Dish. 10.5ft. All electronics included. \$100. You remove from roof and haul. Call after 4pm. 209-239-7804

HP Scanjet 4C scsi scanner. \$40 510-530-1884

Free. Two one-year old male ducks to a good home. 209-823-6984

Pet dark gray rat. Comes with housing, food, bedding and toy. Free to a loving home. Very smart and sweet, does not bite. 925-417-8813

HOUSEHOLD

wooden single bed - just like new - \$20. harmonize well w/ any room atmosphere, Livermore 925-416-2856

Queen size bed [solid pine/light finish] with mattress/box springs and (2) night stands. All in excellent condition. \$350. 925-778-4641

Bunk mattress for full size bed \$50.00 4 drawer chest, dark walnut, wood construction \$75.00 great condition. 925-447-4249

Childs desk w/ chair, 4 drawer, oak veneer, excell. cond. \$100... Crib, mattress & matching 3 drawer dresser, walnut w/ brass trim, excell. cond. \$200 925-449-4168

Stained glass kitchen light fixture \$20: Twin chest bed(mattress not included)\$30; Brown sofa bed \$30. 925-449-0463

Washer & Dryer Classic Maytag Harvest Gold Electric \$75 each 925-846-8864

Moving sale,Aug 24-25, 8am-2pm, 1602 Frankfurt Way,Livermore.Sofa bed, refrig, electrical appliances, washing machine, dryer... 925-455-1073

Childcraft Oak Crib & Change Table. Light finish. Beautiful style. Very good condition. \$150 OBO (Cost \$600 new). 298-833-9141

Entertainment center cherry wood sliding doors hide front. Space for TV, 4 components. Outside dim 44wX54hX24deep. New condition. \$500 OBO. 925-449-3341

Metal storage racks for garage. One black and one chrome. Approx 7 ft tall. \$20 each. 925-829-1474

Blonde Kithen Nook (Table and 2 benches with backs) \$100.00 or BO 925-447-3166

SOFA SLEEPER & MATCHING RECLINING LOVESEAT, by Lane, hunter green, excl. cond., 5 years old. Paid \$1,900 asking \$700 925-456-7972

Computer desk with hutch and printer stand. mostly walnut color with a few battle scars. \$30 or B.O. 925-373-9439

Electric washer/dryer works great \$100. Twin bed with oak headboard, excellent cond. \$125. Antique wood crates 15X23X8 inches \$2 each. 925-292-1877

Light oak crib and changing table. Jenny Lind style. \$50 for both or make offer. Girls clothing infant to 2T. Stroller \$25. 209-836-5764

Two area rugs, wool/sisal, rubberized. 1, runner, 8ftx30inch, \$50. 2, 6ft.x7.5ft. \$100. Both bound in 2, beige cotton binding. Exc. cond. 925-443-3447

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LOST & FOUND

Mountain Bike missing from outside B132N. Black Agressor with front shocks. Please return to B132N or call me. 925-449-8783

Lost: Gold braided wedding ring. Lost near B482. Reward. Sentimental value. 925-846-5722

Found: LLNL notebook and dark blue seater with 3 flower panels in Bldg. 154 around July 1. Call 2-3026.

MISCELLANEOUS

Refrigerator SxS 27 cubic feet with ice/water dispenser. Almond. tGood condition. t\$450 OBO 925-846-0482

PVC Pipe, 1 inch x 20 foot schedule 40, 180 feet in 20 foot sections, take all for \$25.00, you haul. 209-835-9469

8 inch D table saw 3/4 hp. Wards Power Kraft blades \$75.00 925-447-4249

Las Vegas round trip tickets and 2 night hotel for two people. \$200. Las Vegas round trip tickets for two people. \$100. 925-449-0611

Six tickets to Lick Observatory Summer Visitor program. Look through 36 and 40 inch telescope. Friday night September 13. \$5.00 each 925-447-6670

HUGE Garage Sale. Too many items to list, incl. Christmas items!! Saturday, August 24, 925 Dublin Ave., LIVERMORE, 9:00 am-4:00 pm. NO early birds. 925-373-0751

Rolling Stone tickets for 11/12/02 Oakland Arena. Section 205, row 18 will sell at my cost of \$106 each. 4 tickets available will sell in sets of 2. 925-634-8173

Diamond anniversary Band 1carat tw. White gold. Bought less than a year ago for \$1,000 will sell for \$700 obo. 209-523-5458

Formal Dinning Room Table with 6 Chairs. Dark Wood, Like new \$800.00 or BO 925-447-3166

\$1,300.Beautiful Ivory Wedding dress, slip new & boxed size 11 only \$500.\$1600 Weddingset 3/4 carret & baquettes rezembling leaves, gorgeous B/O. 925-371-5371

Medella Pump-in-style breast pump. Leather carrying case with insulated storage area. \$100 925-447-4750

FIREWOOD:Reserve your firewood NOW. Supply is limited. Will deliver if necessary. 925-634-2307

FLEA MARKET Sat. 9/14, 9 AM-2 PM, Asbury Methodist Church, 4743 East Ave., Livermore. Space rental \$15, \$20 with table. 925-373-5712

Mens sportcoat, Navy color, size 42. Worn twice. \$50. 925-648-0671

Wine Barrel 60 Gallon, American oak, used for red wine 3 years Good Condition \$50.00 925-443-7752

Great America Season Passes with FREE VIP parking good till Nov/02. (for adults or children) Paid \$70 each, will sell for \$45 each obo. 925-580-9694

GREAT AMERICA (NEW) Season Pass good till Nov/02. Paid \$70 but will sell for \$45 each obo. 925-447-1428

MOTORCYCLES

Motorcycle Cargo Trailer, tow behind your bike with Ice Chest installed. Trailer uses special hitch(included). Asking \$600.00,OBO. 925-778-6774

1999 - Harley 883-C model, 2,100 miles, garaged, forward controls, black w/\$500 extras, 2-helmets, billet mirrors, lock, see on W-gate lot, \$5700, lv. msg. 925-227-1448

1990 - H-D 1200 Sportster. Custom Deluxe model. Low mileage and lots of extras \$7,500 firm. Serious buyers only. 209-239-4450

2000 - Honda XR400 Motorcycle Baja Kit / Street Legal \$3800. 510-418-2200

MUSIC INSTRUMENTS

Ludwig Drumset, includes 1 crash & 1 high hat. Cherry Red. \$350/obo. Call for details. 209-815-4807

Fender P-bass. Excellent condition. Glossy black. Funk, jazz, rock or country. \$299. 209-836-9082

Trumpet - Conservat'e with older style case. Former music store rental. A great starter trumpet! \$100 925-449-5447

Older up-right piano, good shape, needs a little TLC. \$500. obo 209-402-6245

PETS & SUPPLIES

Parthenogenic geckos. All female, many gravid. 925-516-2446

AKC Registered German Shepard pups, excellent pedigree. \$800.00 209-402-6245

Wonderful 5YO cat needs new home! Black, sweet personality. Fully declawed. Adoption through humane society. 925-449-1476

10-gallon aquarium w/fluorescent lamp and oak stand: \$25.00 OBO. 925-447-2586

RECREATION EQUIPMENT

Orion refractor telescope, model 120EQ. 4.7 inch aperture. In custom wood case, many extras, perfect. \$700/offer. 925-606-6515

NORDIC TRACK Walk-Fit. Original paperwork available. \$100 (New \$600). 209-833-9141

Nordic Flex Gold weight machine.Very good cond.Leg ext and Butterfly attach.Up to 300lbs resistance.\$300 obo 209-830-0684

RIDESHARING

Express your commute, call 2-RIDE for more information or visit http://www-r.lnln.gov/tsmp.

Concord - Drive 1 day/wk + 1 day/mo, any day. Relax the rest of the time! Save money & stress. Good carpool! 925-672-6677, ext. 3-2153

Walnut Creek - Concord, Pleasant Hill new luxury vanpool has openings. Lab hours 8:00 to 4:45. 925-945-4926, ext. 2-2805

PATTERSON - Vanpool has seats available. Work hours 7:30-4:00. Ride with us and take advantage of the Pretax Transportation Program. 209-892-2118, ext. 2-9502

SERVICES

House cleaning in the Tracy area. 209-833-7024

Daycare/Housecleaning. Wil come to your home in Livermore area. Excellent references. 209-531-1527

House Painting - Over 16 yrs experience. Call for free estimate. 209-956-3718

House cleaning from Walnut Creek to Dublin. Call for all your cleaning needs. 925-798-7058

Looking for licensed daycare? Rebeccas Home Daycare in Livermore. 925-449-1239

CHILDCARE, 1-5 yrs. Loving and caring atmosphere. Over 15 years experience. Preschool activities prepare children for kindergarden. 925-373-9428

CoDA ñ Codependents Anonymous - Meets Tuesday Noon B571/R2016. 12 Steps Support BETTER RELATIONSHIPS! Just come or Info 925-447-7070

SHARED HOUSING

Tracy - Room for rent in house overlooking pool/waterfall, \$500 month, cable included. Available ASAP. 209-833-6443

Livermore - - room in 3BR/2BA home in quite neighborhood, private bath, full privileges, N/S N/P: \$550 (utilities incl.) + Dep. Discount for commuter. 925-455-5362

Livermore - Livermore - available now - room for rent in 3 bed. home. 3 miles from lab. \$550 mo. does include utilities & full privillages. 925-447-9062 925-447-9062

TRUCKS & TRAILERS

2000 Toyota Sienna XLE, fully-loaded, mint-condition, 35k miles, 6 year/75K Toyota Platinum Extended warranty. \$23,500 OBO 925-447-0430

1993 - toyota p/u wht short bed 4x4,camper shell,bed liner,lumber rack.very clean runs great 5:900 or o.b.o 925-550-1736

2000 - Silver Toyota Tacoma PreRunner, Xtracab. Automatic, chrome wheels, wide tires, upgraded CD player and speakers. 29K. Excellent Condition! \$18,500 925-606-8077

90 - M30 Infinite, 2dr, 198K, good cond, auto, ac, new brakes/tires/radio-cd, no accidents, \$2500 OBO 925-245-1414

1974 - 1974, Chevy, 3/4 ton 4x4, 350c.i., auto. trans. runs well. 209-530-0156

1994 - Jeep Grand Cherokee Limited, power everything, white, custom detail, radio CD, upgraded leather interior, tow pkg, alarm, looks great \$12000 925-449-5510

1999 - Thor Hurricane motor home. 30 feet. Fully loaded. Sleeps 6. Queen size bedroom. Call for pricing info 916-838-0947

1997 - Ford Ranger XLT,AC,PS,new Sony AM/FM/CD,ABS, rear slider,bedliner,tow package,prem wheels,new tires,76K mi,opt. tool box,\$7000 OBO,runs perfectly! 925-708-5150

1997 - Dodge 4x4 Sport Pick-Up with Extra Cab. 120K Mi. Red. Great condition. Located in Livermore. Asking \$10,000. 925-930-0484

1990 - Jeep Cherokee Laredo, 99K miles, 4.0 liter 6-Cyl, 4X4, AC, PW, PL, PS, CC, PM, AM/FM/Cass/Steri, Tow/Pkg, Tilt, Tint/wind, 5,200 O.B.O. 925-376-0316

VACATION RENTALS

MAUI-Kihei 1,2&3 bedroom condos. On beach, large pool,tennis courts,putting green,near golf course. Beautiful grounds, washer/dryer in units. 925-846-8405

South Lake Tahoe - Large home in quiet wooded area, close to hiking/biking trails. Gas barbeque, pool/foosball tables newer furniture. 925-484-3162

SOUTH LAKE TAHOE - 3 Bedroom 2 bath Chalet, newly remodeled,nicely furnished, all amenities,Park w/Lake,playground, etc. Great for Families! Hurry for Summer! 209-599-4644

Soda Springs/Donner Summit. Classic A frame, 2BR/1BA+Loft, sleeps 8, close to biking, hiking, everything. \$200 wknd,\$500/week call for availability 209-836-3481

Maui, HI - Kahana Reef oceanfront 1BR/1BA condominium. Beautiful two-island view, oceanside pool, and BBQs. Low LLNL rates for year-round reservations. 925-449-0761

WANTED

Stationery Exercise Bike Wanted! In good condition and in working order. Reasonably priced. 510-653-2566

Appliances wanted for remodel. Electric cooktop, electric oven, dishwasher. Must be good condition, but need not be new. Thanks! 510-704-0768

To lease Motorhome parking space with hookups for 6-12 months in/near Livermore: 2 adults, 2 cars, no kids. 925-352-6134

NEWS OF NOTE



'Industrial Partnering Report' spotlights Lab innovation

By Stephanie Esposito

NEWSLINE STAFF WRITER

Past and present Laboratory-developed technologies that have transferred into industry or have been commercialized take the spotlight in "Industrial Partnering Report," produced by the Industrial Partnerships and Commercialization (IPAC) organization.

The report offers a brief historical look into technologies that have been both of interest and highly successful to the Laboratory and outside industries, as well as the formal partnerships that have taken place between the Lab and industry over the last 10 years.

"Since this year is our 50th anniversary, rather than just publishing an annual report, I wanted to start back in our earliest days and capture the flavor of some of our history of rich and productive relationships with the private sector," Karena McKinley, IPAC director, said. "For example, in our research for this publication, we identified over 50 start-up companies by Lab employees and others based on our technical advances or on know-how developed here."

According to McKinley, numerous R&D partnerships between the Lab and the private sector have influenced the direction of entire industry sectors such as supercomputers, laser optics and biotechnology.

Such partnering combines the best of the Laboratory's scientists, engineers and innovators with those of outside industry to solve problems of national importance.

Some of the success stories have taken years to reach their biggest impact, McKinley explained. For example, in 2000, *Fortune* magazine recog-



Lab-developed technology is featured in the *Industrial Partnering Report*.

nized former Lab employee Jim Bryan as one of the six "Heroes of U.S. Manufacturing." Jim's invention, which grew out of precision engineering challenges of nuclear weapons, was licensed to Renishaw, Inc. in 1986 and has since been used to test literally billions of dollars worth of machine tools.

"Our partnerships continue to gain momentum," McKinley said, "with this year's results pointing the way to an even brighter future."

As stated in the report, one of LLNL's start-up company licensees was recently listed in *Inc. Magazine* as one of the nation's 500 fastest-growing companies. The annual sales of LLNL's top five licensees shot up in the past three years from less than \$10 million to \$60 million. And a number of LLNL licensee products are on steep growth

curves.

The report also illustrates the role that partnerships play in some of the Lab's major programs, such as national security and counterterrorism, the National Ignition Facility and the Accelerated Strategic Computing Initiative.

The Sunnyvale company Cepheid, for example, used Lab technology to develop the Smart Cyclor DNA testing system, which has been beneficial to the nation's anti-terrorism efforts. The system was part of the Livermore/LANL jointly developed Biological Aerosol Sentry and Information System (BASIS) that gained acclaim during the Winter Olympic Games in Salt Lake City.

As the research world becomes increasingly connected, and as the amount of R&D conducted in the private sector grows, McKinley believes the Laboratory's tradition of industry collaborations will continue to expand.

"This is a dynamic and exciting time for LLNL's private sector partnerships," McKinley explained. "We are enthusiastic about the impact of Laboratory-developed technologies as they are commercialized and appear in the marketplace. Equally important is our partners' contributions to the success of our own programs, whether through their own technical advances or by transforming our Lab-developed technologies into products we can buy rather than having to continue to fabricate ourselves. We take pride in Livermore's creative inventors and authors whose work forms the basis of our partnerships. And, of course, we're proud of the success of our partners and look forward to even greater success in the future."

The 2001 Industrial Partnering Report is now available. For more information or to have the report sent to you, contact Yvonne King, 2-7299 or king26@llnl.gov.

Public comment period for BSL-3 extended

Based on public requests, the Department of Energy, National Nuclear Security Administration's Oakland Operations Office is extending the public comment period for the draft environmental assessment for a Biosafety Level 3 Facility at the Laboratory.

The extension will run through Sept. 7. The public comment period was originally scheduled from July 24-Aug. 23. Written comments should now be sent by Sept. 7 to: Richard Mortensen, DOE NEPA Document Manager, U.S. Department of Energy, Livermore Site Office, M/S L-293, P.O. Box 808, Livermore, CA 94551-0808 or sent via e-mail to rich.mortensen@oak.doe.gov, or by fax to (925) 423-5650.

The Lab's Nonproliferation, Arms Control, and International Security Directorate proposes to construct a Biosafety Level 3 (BSL-3) Laboratory Facility adjacent to Bldg. 361. The new facility would be operated primarily for NAI by the Biology and Biotechnology Research Program in its continuing support of both LLNL's basic and applied bioscience and health research mission and its support of the NAI mission of enhancing the nonproliferation of weapons of mass destruction mission. The NNSA also seeks, through use of this facility, to develop, demonstrate, and implement first-response rapid detection systems to improve domestic defense capabilities and, ultimately, to save lives in the event of a biological attack.

Current work at LLNL in bioscience research is limited to that which can be conducted in existing BSL-2 laboratories. Work in support of DOE and NNSA missions requires specialized labora-

tory facilities to safely and securely handle and store Risk Group-3 infectious organisms in addition to those that are currently stored and handled safely and securely at the BSL-2 level in accordance with the requirements of the Centers for Disease Control and Prevention (CDC) and the National Institutes of Health (NIH).

The proposed \$1.5 million, 1,500 square-foot facility would consist of three BSL-3 laboratory rooms and be designed and built in accordance with guidance established by the CDC and NIH. The facility would either be constructed in modules off-site and assembled on-site, or it would be constructed "from the ground up" on-site.

Copies of the draft environmental assessment are available at the following locations:

- The DOE Energy Information Center, Oakland Federal Building, First Floor of the North Tower, Room 180N, 1301 Clay Street, Oakland, (510) 637-1762.
- Lawrence Livermore National Laboratory Public Reading Room, Trailer 6525, located at the East Gate Entrance off of Greenville Road, Livermore, 424-4026.
- Livermore Public Library, 1000 South Livermore Ave., Livermore.
- Tracy Public Library, 20 East Eaton Ave., Tracy.

Copies of the document are also available by contacting the DOE Oakland Operations Office Energy Information Center at (510) 637-1762 or the DOE/OAK Website: <http://www.oak.doe.gov>, go to "Services" then go to "Environmental Assessments."

BioSTAR and IPAC help connect Lab to industry

More than 50 Lab researchers and businesses learned about how working with industry partners brings new money into a research lab and creates industry commercial opportunities, during a recent "Outreach Reception" at the Lab. The reception was held last week by BioSTAR — the UC Discovery Grant for Biotechnology — and the Lab's Industrial Partnerships and Commercialization Office (IPAC).

BioSTAR and other Discovery Grants are a catalyst to stimulate future growth of LLNL's intellectual property portfolio. Collaborative research opportunities through the UC Discovery Grant program are also available in communications research, microelectronics, electronics manufacturing, digital media and life sciences information technology.

Up to \$20 million are available to fund new UC Discovery Grants this year. To learn more about opportunities in each supported field, visit the UC Discovery Grant homepage at <http://www.ucdiscovery-grant.org>.

Lab scientists can meet prospective industry partners at BioSTAR's next Industry Outreach Reception, Sept. 4 at Exelixis in South San Francisco. For more information about BioSTAR and upcoming events please visit <http://uc-biostar.berkeley.edu> or contact David Gilbert at 510-643-5542 or via email at dgilbert@uclink.berkeley.edu.



THE BACK PAGE

CARBON

Continued from page 1

the effectiveness of direct CO₂ injection as a carbon sequestration strategy.

The Ocean Carbon Sequestration Research Program in the DOE's Office of Biological and Environmental Research funded the work.

Scientists used one-dimensional box-diffusion models and three-dimensional simulations run under the radiocarbon and sequestration scenarios described in Livermore's Ocean Carbon-cycle Model Intercomparison Project protocols.

"These simulations indicate that the amount of time it takes for a water parcel to return to the ocean surface increases with depth, but is not related to the amount of time since that parcel was last at the surface," Duffy said.

Injections were simulated at 800 meters, 1,500 meters and 3,000 meters for 100 years near the Bay of Biscay, New York City, Rio de Janeiro, San Francisco, Tokyo, Jakarta and Bombay.

The models showed that injection at 3,000 meters is quite effective at sequestering carbon from the atmosphere for several centuries while injections at shallower depths are less effective. In general,



MONTEREY BAY AQUARIUM RESEARCH INSTITUTE

This Pacific grenadier fish swims next to a beaker of liquid carbon dioxide, 3,627 meters deep off Central California.

injections into the Pacific Ocean (San Francisco and Tokyo) were more effective than injection at the same depth in the Atlantic Ocean (New York City, Rio de Janeiro and the Bay of Biscay).

"We showed that radiocarbon content alone at a given location in the deep ocean is a poor predictor of how effective CO₂ injection at that

location is at sequestering carbon away from the atmosphere," Caldeira said. "In contrast, our models showed that the depth of injection alone is a good predictor of the effectiveness of the CO₂ injection."

Researchers have yet to determine the effects of direct injection on marine life.

Whether carbon dioxide is released in the atmosphere or the ocean, eventually about 80 percent of the carbon dioxide will end up in the ocean in a form that will make the ocean more acidic. While the carbon dioxide is in the atmosphere, it could produce adverse climate change.

In previous studies, Caldeira showed that unless carbon dioxide is converted to some other form before injection, it will degas back to the atmosphere when diffusion or ocean circulation returns it to the ocean surface.

Other methods of carbon sequestration include ocean fertilization, in which the biology of phytoplankton (which grows close to the ocean surface) is changed so that it increases the conversion of carbon dioxide to biomass. The conversion is likely to transport acidity from the surface ocean to the deep ocean.

FROG

Continued from page 1

advocate of the project. "But we're looking forward to new possibilities from the genome sequence.

"Using a compare-and-contrast approach with the human sequence, and the experiments that are possible in frogs, we'll definitely make real progress in decoding the human genome," Harland said.

Added Robert Grainger, a leading *Xenopus* researcher from the University of Virginia: "Studies on frogs have long been instrumental in understanding such fundamental processes as cell division and how cells in the embryo communicate with one another. Because these are the processes that go awry when birth defects occur or cancer strikes, we must seek a better understanding of them. This genome project will provide a major step in that direction."

The JGI, one of the largest public genome sequencing centers in the world, is operated jointly by three DOE national laboratories man-

aged by the University of California - Lawrence Berkeley, Lawrence Livermore and Los Alamos. In addition to the *Xenopus* project, the JGI has genomics programs focused on microbes, fungi, fish, and plants.

The institute brings together the research capabilities of the national labs and helps to convene multi-national teams that undertake large-scale genomic projects. This collaborative approach was used recently to sequence the genome of the pufferfish *Fugu rubripes*. Researchers reported last month that by comparing the *Fugu* sequence with the results of the Human Genome Project, they were able to predict the presence of nearly 1,000 previously unidentified human genes.

For the *Xenopus* project, the JGI convened an advisory board to organize and disseminate information about the sequencing effort. Members include researchers from the National Institutes of Health (NIH), UC Berkeley, UC Irvine, the University of Virginia, the Institute for Systems Biology in Seattle, Children's Hospital in Cincinnati, and the University of Calgary in Canada, as well as from the United

Kingdom and Japan. Steven L. Klein, chair of a *Xenopus* working group at NIH's National Institute of Child Health and Human Development, noted that his agency will provide additional resources to NIH-sponsored labs to add data for this collaborative genome project.

JGI is a leader in sequencing organisms of crucial interest to researchers around the world. For the Human Genome Project, JGI sequenced human chromosomes 5, 16 and 19, which together constitute 11 percent of the human genome. JGI sequenced mouse DNA related to human chromosome 19 to illuminate the molecular evolutionary history of the two species. JGI has also sequenced the environmentally important white rot fungus (*Phanerochaete chrysosporium*) and nearly 50 important microorganisms.

Additional information and progress reports on JGI projects, including daily updates of sequence information and assembly statistics, are available at www.jgi.doe.gov. *Xenopus* annotation workshops for members of the research community will be held at the JGI's facility in Walnut Creek.

Undersecretary of State visits Lab



JOSEPH MARTINEZ/TID

Undersecretary of State John Bolton (center) met with Director Michael Anastasio (right) and AD Wayne Shotts during his visit to the Lab Tuesday. Bolton received overviews on the Lab's work in national security and counterterrorism, and toured the National Ignition Facility and the Center for Global Security Research.



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